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Read the following passage and answer the questions that follow.

World's first monkey clones created in a Chinese laboratory

[1] For the first time, scientists have engineered a pair of monkey clones using the somatic cell nuclear transfer (SCNT) technique, also known as the Dolly method. Dolly the sheep was the world's first mammal to have been successfully cloned from an adult cell. Using the same technique to clone monkeys is a major breakthrough for scientists, as monkeys are genetically similar to humans.

5 [2] The long-tailed macaques, named Zhong Zhong and Hua Hua, were made from foetal cells developed in a petri dish. The monkeys are identical twins and carry the same genetic information of the monkey foetus that supplied the original DNA.

[3] Before Dolly the sheep was cloned in 1996, scientists could only create clones using the DNA from embryos. This method is not too challenging because embryonic cells are undifferentiated and hence have the ability to grow into the different kinds of cells that formed a living organism. The Dolly method is different. It involves taking the DNA-carrying nucleus of a specialized adult cell from a part of an animal's body, and inserting it into an unfertilized egg cell that has had its own nucleus removed. An electric current is used to trick the egg into thinking it has been fertilized, and it starts to develop into an early embryo. The embryo is then implanted in a surrogate mother for development.
10
15 From there, it is allowed to grow just as a naturally fertilized egg would.

[4] Once cloning from adult cells proved possible, scientists began to experiment with and improve their methods on other species. Since the birth of Dolly the sheep, 23 other species of animals have been cloned using the same technique, including cats, dogs, pigs, rats and cattle. However, until now, monkeys had been resistant to such techniques.

20 [5] In truth, monkeys have been successfully cloned using embryonic cells before. In 2000, scientists cloned a monkey for the first time by splitting a single two-cell embryo into two individual cells to produce genetically identical twins. The same process occurs in nature all the time and is the cause for natural identical twins. However, using this straightforward embryo splitting method in cloning can only create a maximum of four identical individuals.

25 [6] Before the birth of Zhong Zhong and Hua Hua, all previous endeavours to clone monkeys through the Dolly method had fallen flat. Mu-ming Poo, who led the project, said that their newfound success came after adapting several new techniques. These included a new type of microscopy which allowed scientists to better observe cells, as well as using a number of compounds which promote cell reprogramming. Even using these new techniques, however, the success rate was low. Out of the 127
30 eggs they created, only two were successfully birthed.. Moreover, the scientists were only able to reprogramme cells from foetal monkey tissue, not adult cells.

[7] Despite the poor success rate, the scientists in charge of the project are bullish about the future of primate cloning. Poo said that this new approach was more customizable and could yield a greater number of genetically identical animals than the prior embryo splitting method used to clone monkeys.
35 He said that using the SCNT technique along with precise gene editing will allow scientists to engineer ideal non-human primate animals in order to research human diseases and screen drugs. He also hopes that improved methods could one day lead to higher success rates and even allow for the capability of using adult cells for cloning primates.



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40 [8] Ultimately, scientists hope to use monkey clones to assist in the battle against various human diseases. One possible use could be to find out how genes and the environment interact in diseases. Poo said that Alzheimer's and Parkinson's diseases were the first two diseases they had in mind for research using cloned monkeys. He went on to note that monkeys could be used to study any diseases stemming from one or multiple genetic mutations, including particular cancers. However, scientists in charge of the project want to first study the development of the twins' brains of the twins. As the
45 monkeys have identical genes and are living in the same environment, the scientists want to see whether their brains will develop in similar ways or diverge naturally.

[9] Needless to say, the cloning of monkeys poses many ethical concerns. Many are worried that the SCNT technique could one day be used to manufacture human clones. However, scientists are quick to point out that the current methods would be incapable of creating an identical clone of a grown human.
50 'For many cell types, reprogramming is more difficult for adult cells than for foetal cells,' said Robert Lanza, chief scientist at the Astellas Institute for Regenerative Medicine, whose team cloned human adult skin cells for the first time in 2014.

[10] In addition to the prospect of human cloning, many people are troubled by the ethicalness of cloning and studying monkeys in such a way. Peter Dabrock, an ethicist at Friedrich-Alexander
55 University in Germany, wrote 'At present, it has not been sufficiently demonstrated that there are no alternatives to using macaque monkeys for such research.'

[11] Using monkeys for research is more tolerable in China than it is in the West. Poo also pointed out that his scientists followed all international guidelines for the treatment and care of their monkeys. He
60 hopes that Western societies will gradually change their viewpoint after his team demonstrates the usefulness of using cloned monkeys for the purpose of curing diseases.

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Answer the following questions using information from the text. Write your answers in the spaces provided. For multiple-choice questions, choose the best answer and blacken ONE circle only.

1 Why is cloning monkeys using the Dolly method is a major breakthrough for scientists?

2 What species are Zhong Zhong and Hua Hua?

3 When was Dolly the sheep cloned?

4 Order the following steps of the Dolly method. Number the steps (1–4).

The nucleus is inserted into an egg cell.

The egg cell is implanted into a surrogate mother.

The nucleus is taken from an animal's cell.

An electric current is used on the egg cell.

5 Read paragraphs 4 and 5 and decide if the following statements are **True (T)**, **False (F)** or the information is **Not Given (NG)**. Blacken ONE circle only for each statement.

Statements	T	F	NG
i) Over 20 different species have been cloned using the Dolly method.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ii) A monkey was cloned for the first time in 2000.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iii) Scientists have so far been unable to clone fish and insects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6 Find words in paragraphs 4 and 5 that mean the same as the following:

i) not affected by something

ii) dividing into two

iii) easy to do

7 Find a phrase in paragraph 6 that means the same as 'failed'.

8 What does 'These' (line 28) refer to?

9 What is the success rate of cloning monkeys using the new techniques?



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10 In line 40, 'poor' means _____.

- A having very little money
- B deserving pity and sympathy
- C lower quality than expected
- D not good or skilled at something

A B C D

11 Find words in paragraphs 7 that mean the opposite of the following:

- i) pessimistic _____
- ii) imperfect _____

12 What are the two benefits of using the Dolly method over the embryo splitting method?

- i) _____
- ii) _____

13 Which two diseases does Poo want to research using cloned monkeys?

- i) _____
- ii) _____

14 Why does the cloning of monkeys raise ethical concerns? Give two reasons.

- i) _____
- ii) _____

15 Complete the following summary about the monkey clones. Use ONE word to complete each blank.

Scientists in (i) _____ have created the world's first monkey clones using the (ii) _____ method. They hope to use the clones to study the development of (iii) _____ under the same environment and potentially find out more about diseases in (iv) _____. However, some people are worried that such experiments are not (v) _____.



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Useful sentence patterns

Emphasizing a fact: *In truth* + comma + fact

In truth, monkeys have been successfully cloned before.

Introducing a general statement: *Needless to say* + comma + statement

Needless to say, the cloning of monkeys poses many ethical concerns.

Talking about a challenge: *in the battle against* + object

Ultimately, scientists hope to use monkey clones to assist in the battle against various human diseases.

Make sentences using the sentence patterns above.

In truth + comma + fact

1 _____

2 _____

Needless to say + comma + statement

1 _____

2 _____

in the battle against + object

1 _____

2 _____



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Useful vocabulary

adapt (v.)	alternative (n.)	assist (v.)	chief (adj.)
demonstrate (v.)	gradually (adv.)	observe (v.)	process (n.)
split (v.)	tolerable (adj.)		

Complete the following paragraphs using the words in the box above. Make sure your answers are grammatically correct.

As many of you may already know, recently, my family decided to get a new pet puppy. We had been thinking about it for some time, but we had concerns about puppy sellers who keep their dogs in unhygienic and appalling conditions that are not (1) _____. Therefore, we decided to seek an (2) _____ to these unethical sellers.

A few weeks ago, a family friend (3) _____ us in the (4) _____ finding ethical breeders. She directed us to a gentleman who treats his dogs humanely and is concerned more about their welfare than his own profits.

When we visit the breeder, he (5) _____ to us how he takes care of his dogs. His whole home has been (6) _____ to suit the needs of his dogs. They are clearly his (7) _____ concern.

While we were there, we (8) _____ some puppies playing with their mums. We tried to get familiar with the puppies and (9) _____, one puppy in particular took a shine to me. I wanted to take it home immediately, but the breeder said it was not a good idea to (10) _____ the puppy from its family yet because it was still too young. I cannot wait to bring the puppy to our home when it is old enough for adoption!

Useful phrases from the passage

also known as	a major breakthrough
be resistant to	bullish about
fallen flat	in the battle against
newfound success	the prospect of

Writing topic

Do you think cloning monkeys is unethical? Do you think it is wrong to do experiments on animal clones in order to find cures for human diseases? Why/why not? Write your answer in about 250 words.

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Answer Key

Comprehension

- 1 because monkeys are genetically similar to humans
- 2 long-tailed macaques
- 3 1996
- 4 2, 4, 1, 3
- 5 i) T
ii) T
iii) NG
- 6 i) resistant
ii) splitting
iii) straightforward
- 7 fallen flat
- 8 the new techniques that the scientists adapted
- 9 two out of 127
- 10 C
- 11 i) bullish
ii) ideal
- 12 i) more customizable
ii) could yield a greater number of genetically identical animals
- 13 i) Alzheimer's disease
ii) Parkinson's disease
- 14 i) It opens up more possibilities for human cloning.
ii) There are not sufficient evidence to support the cloning of monkeys for scientific research.
- 15 i) China
ii) Dolly
iii) brains
iv) humans
v) ethical

Useful Vocabulary

- | | | | | | |
|---|-------------|---|--------------|----|-----------|
| 1 | tolerable | 5 | demonstrated | 9 | gradually |
| 2 | alternative | 6 | adapted | 10 | split |
| 3 | assisted | 7 | chief | | |
| 4 | process | 8 | observed | | |



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Model Writing

Recently, scientists in China have unveiled the first monkeys cloned using the Dolly method. This has raised ethical concerns for some. One worry is that the cloning of monkeys will one day lead us to the cloning of human beings. However, this does not seem to be a valid concern at the time being since it is impossible to clone adult humans with the current technology. Furthermore, the success rate of the Dolly technique is quite low.

Scientists hope to use these cloned monkeys to research diseases found in humans in the hope of one day finding a cure for them. In order to do this, they will use gene editing to create perfect clones for whichever disease they want to study. In my opinion, this is unethical and unacceptable. Scientists could, for example, create monkey clones with Alzheimer's disease. What gives us the right to play God in such a way? It would be cruel of us to do such a thing. These monkeys are living beings and our closest evolutionary ancestors. Thus, we should treat them more humanely.

Some would say that the ends justify the means. They might argue that human life is more important, and we should do whatever we can to make human life last longer. However, I believe that by doing so we will be losing what it means to be human. Considering how advanced modern medicine already is, I hope that we will be able to find other methods to fight diseases.